Horticulture Series No. 633 January 1993



# EVALUATION OF 1992 TOMATO CULTIVARS FOR PROCESSING

Stan Berry and Kurt Wiese

Department of Horticulture
Department of Food Science and Technology
Ohio Agricultural Research and Development Center
The Ohio State University
Wooster, Ohio 44691

This page intentionally blank.

# EVALUATION OF 1992 TOMATO CULTIVARS FOR PROCESSING

Stan Berry and Kurt Wiese
Department of Horticulture
Department of Food Science & Technology
The Ohio State University/OARDC

## Introduction

Tomatoes in Ohio continue to be an important processing crop with Ohio ranking behind California in volume of processed tomatoes, tomato juice, and tomato products. This study evaluates new tomato cultivars for processing and improving the quality of the various type of canned tomato products for the Ohio region of the United States.

## Materials and Methods

The 1992 tomato processing evaluation included 25 cultivars grown in plots under acceptable commercial practices at the OARDC Vegetable Crops Branch near Fremont. Each cultivar was mechanically harvested using little or no sorting and transported to The Ohio State University Food Processing Pilot Plant at Columbus.

### Evaluation

Twenty field-run tomatoes were randomly selected and used for objective and subjective raw quality evaluation.

- Tomatoes were classified as globe, pear, blocky, or ovate in *shape*.
- *Size* was determined by weighing a 20-lb. sample, counting the number of tomatoes, and then calculating the number per pound.
- *Stem scar length* and *styler scar length* were measured objectively by determining the average length in inches of each scar.
- *Firmness* was determined subjectively and rated as soft, puffy, medium, hard.
- The sample was then quartered and extracted as follows:
  a. A random 8.5 lb sample of tomatoes was washed, quartered and the stem removed from the fruits.
  b. Place the sample in a blender and cover while pulling a vacuum (to 27") vacuum.

---



H-484/1-93/200

This page intentionally blank.

c. Stop blender, remove the container without breaking vacuum, turn upside down and shake. Return the container to the blender and blend for 1 minute.

d. Remove the blender lid, insert 14-mesh wire screen into container to collect juice. This juice, which is designated as the raw juice, will be evaluated for color, pH, titratable acidity, ascorbic acid, and soluble solids.

- The *color* was evaluated with a Minolta hand-held colorimeter, and the L, a and b values were determined. The $\tan^{-1}$ (b/a) where 0 stands for a red sample and 90 represents a yellow sample.

- *Percent soluble solids:* An Abbe refractometer with temperature compensation was used for direct determination of percent soluble solids.

- *pH and total acidity*: The pH and total acidity were determined using the computer aided titrimeter (CAT) composed of the Fisher units of titration controller (model 450), titration burette (model 400), and titration stirrer (model 460) using 0.0863N sodium hydroxide.

- *Ascorbic acid*: Ten ml aliquots of tomato juice were diluted with 90 ml of 1% metaphosphoric acid and filtered. a 10 mo aliquot of the filtrate was titrated with 0.2% 2.6-dichloroindophenol indicator solution. Milligrams of vitamin C were determined by the following formula:

  Dye factor x ml of dye x 100 = mg vitamin C/100 g

Preparation and processing of the tomato

All tomatoes were prepared for canning by washing, lye peeling (18% caustic soda at 190°F [88°C] for 20 seconds), filling, closing, and processing in a still retort as whole tomatoes. Each lot of whole tomatoes was filled to 10.0-10.5 oz in No. 303 x 406 size fruit enamel tin cans with a 50-grain salt tablet containing 44.5% NaCl, 15% $CaSO_4$, 37% citric acid, and 3.5% $NaHCO_3$, and covered with hot juice (190°F) [88°C] and steam flow closed.

*Juice* was made from each cultivar of tomato by washing, chopping, preheating to 190-200°F [88-90°C], extracting using a 0.023-inch screen, filling in 303 x 406 enamel cans, adding a 30-grain NaCl salt tablet, closing, processing for 20 minutes at 220°F, and cooling to 100°F.

This page intentionally blank.

## Evaluation Procedures

> Raw tomatoes were graded for shape, size, firmness, stem scar, stylar scar, and color of the tomato, inside and out.

> The tomatoes were processed into juice. The raw and the 'hot break' juice were evaluated.

*Juice Characteristics*

+ Color was measured using the Agtron and as L, a, b using a Minolta colorimeter.
+ Soluble solids were determined using an Abbe refractometer.
+ pH and total acid were measured using a computer aided titrimeter.
+ Ascorbic acid was evaluated using AOAC procedures with 2,6 dichloroindophenol dye.

*pH Values of Processing Cultivars*

Raw Juice - highest values
>>>> 07983, 08556, 0X46
Raw Juice - lowest values
>>>> 07814, P696, 091145

Sterile Juice - highest values
>>>> 087175, 088119, A1814
Sterile Juice - lowest values
>>>> 0X6, 0X38R, 091145

*Soluble Solids of Processing Cultivars*

Raw Juice - highest values
>>>> 0X4, 0X6, 090116
Raw Juice - lowest values
>>>> 08690, P696, 088119

Sterile Juice - highest values
>>>> 0X42, 08994, 090116
Sterile Juice - lowest values
>>>> 07814, 0X6, 088119

*Total Acid of Processing Cultivars*

Raw Juice - highest values
>>>> 07814, 0X9, 090116
Raw Juice - lowest values
>>>> 08690, 0X38, 088119

Sterile Juice - highest values
>>>> 07814, 0X9, 090116
Sterile Juice - lowest values
>>>> 0X38, 08690, 088119

*Vitamin C of Processing Cultivars*

Raw Juice - highest values
>>>> 0X38, A1814, 091145
Raw Juice - lowest values
>>>> 07814, 08550, 086120

Sterile Juice - highest values
>>>> 0X38R, 0X42, 090116
Sterile Juice - lowest values
>>>> 08550, 0X1, 0X4

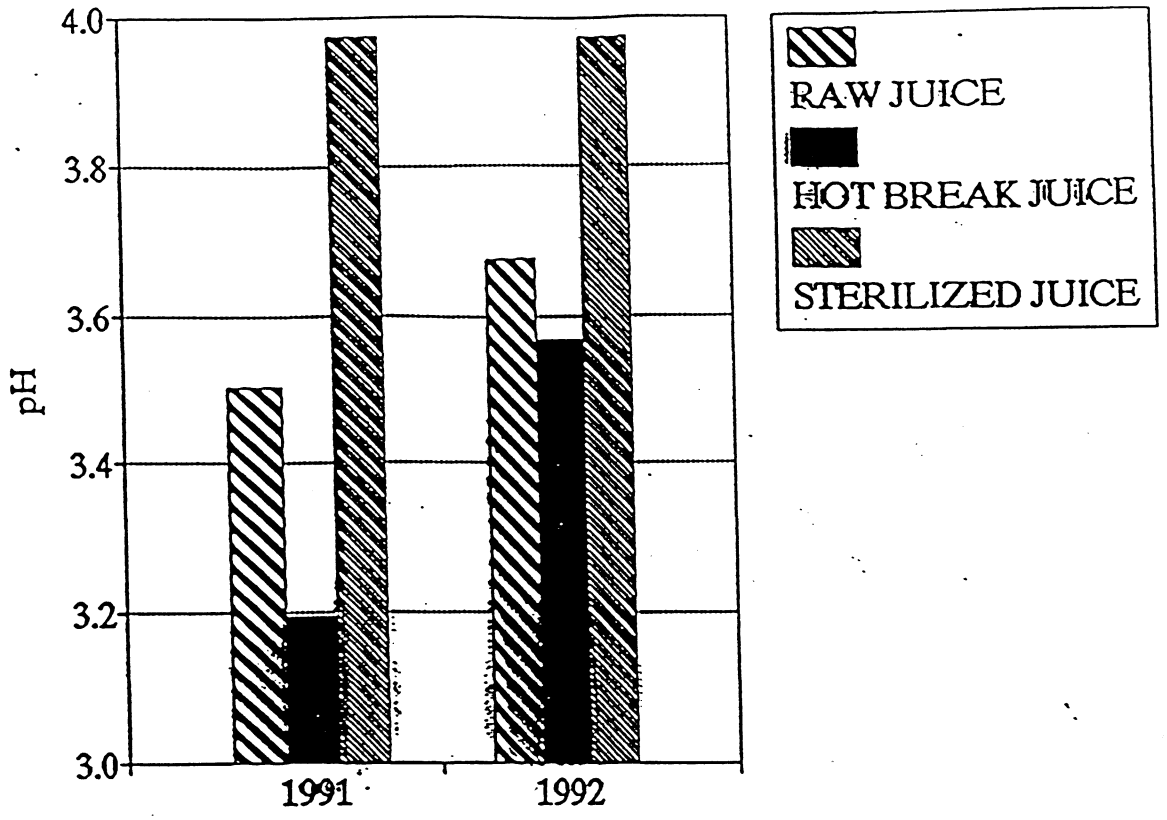
*Agtron Color of Processing Cultivars*

Raw Juice - highest values
>>>> 08245, 08556, 0X49
Raw Juice - lowest values
>>>> 0X46, 08994, A1814

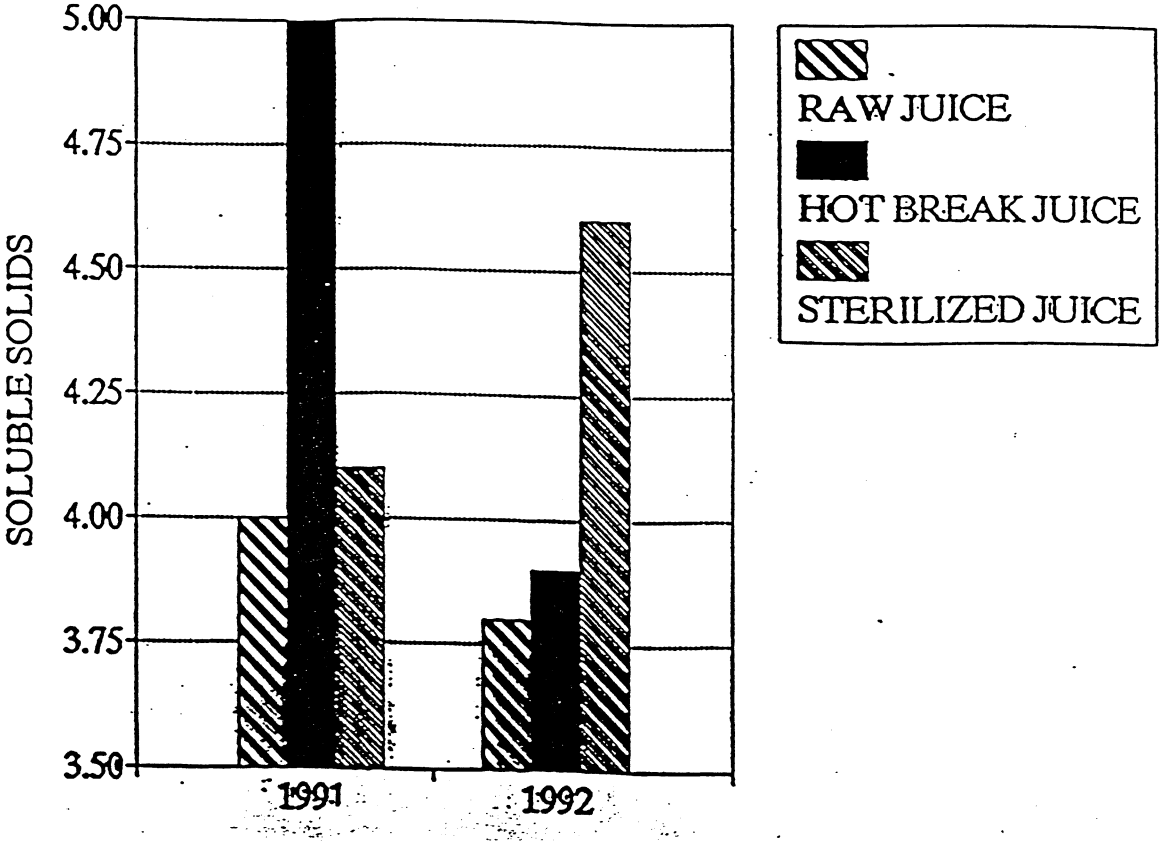
Sterile Juice - highest values
>>>> 0X4, 08675, 08986
Sterile Juice - lowest values
>>>> 08690, 087175, 090128

This page intentionally blank.

# EVALUATION OF PROCESSING CULTIVARS

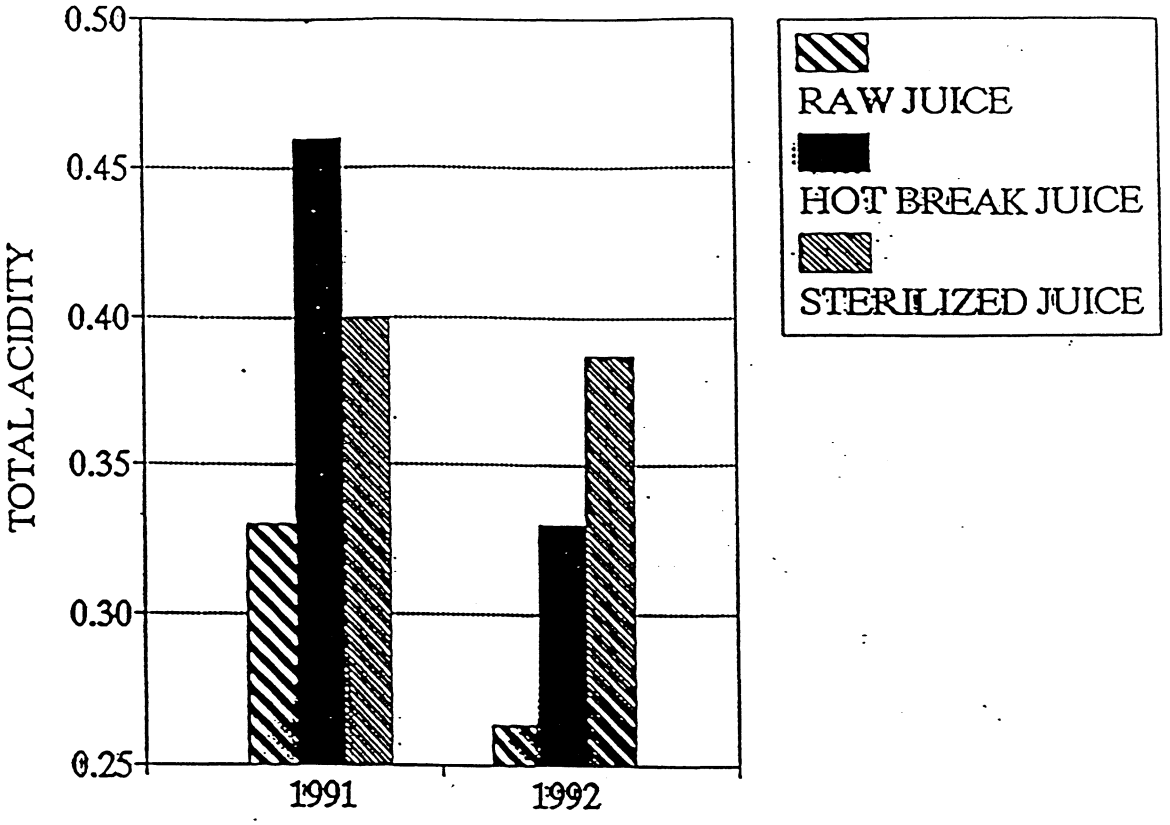



# EVALUATION OF PROCESSING CULTIVARS

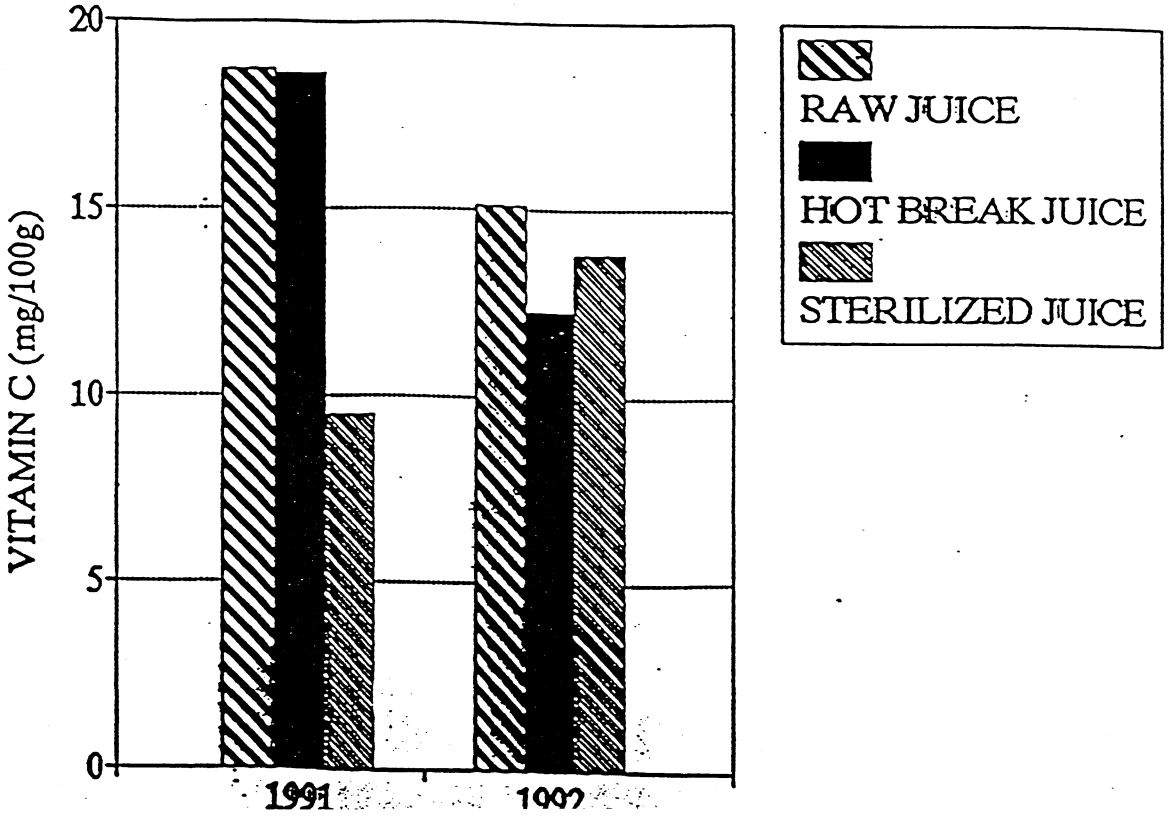


This page intentionally blank.

# EVALUATION OF PROCESSING CULTIVARS

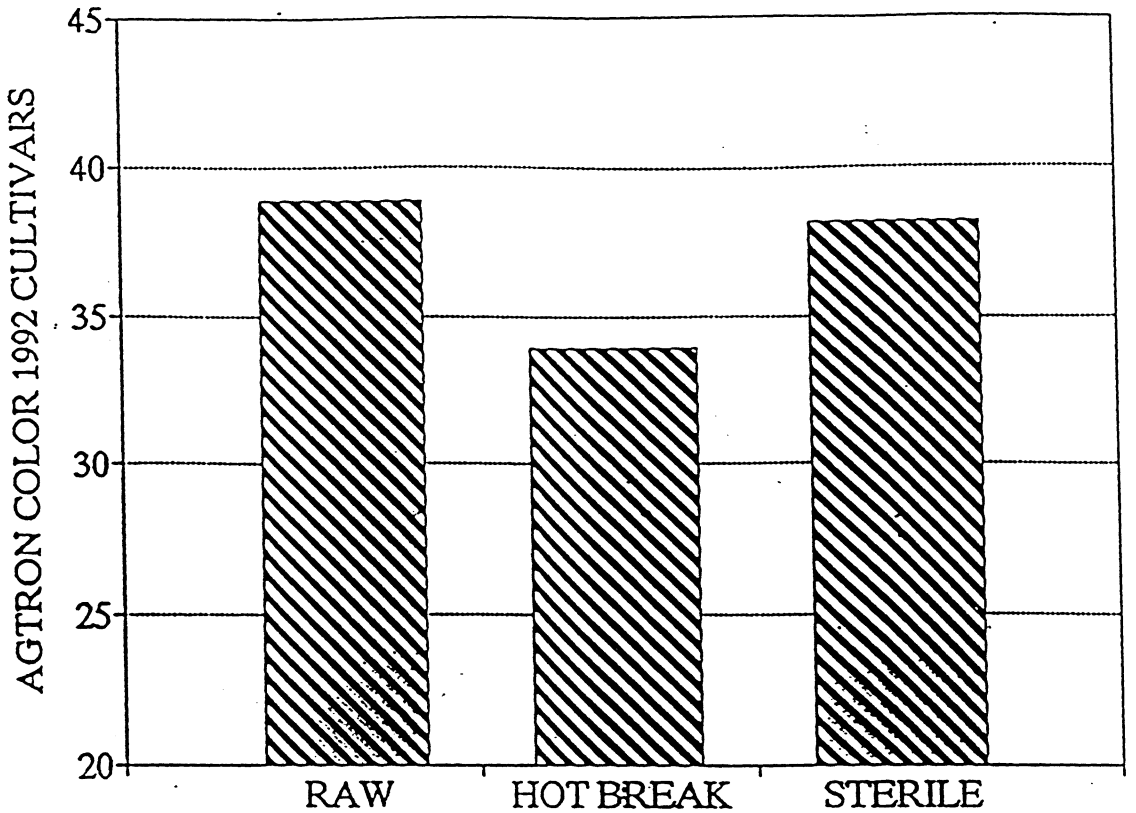



# EVALUATION OF PROCESSING CULTIVARS



This page intentionally blank.

# EVALUATION OF PROCESSING CULTIVARS



This page intentionally blank.